(54) Title: CONVERGENCE-ENABLED DVD AND WEB SYSTEM
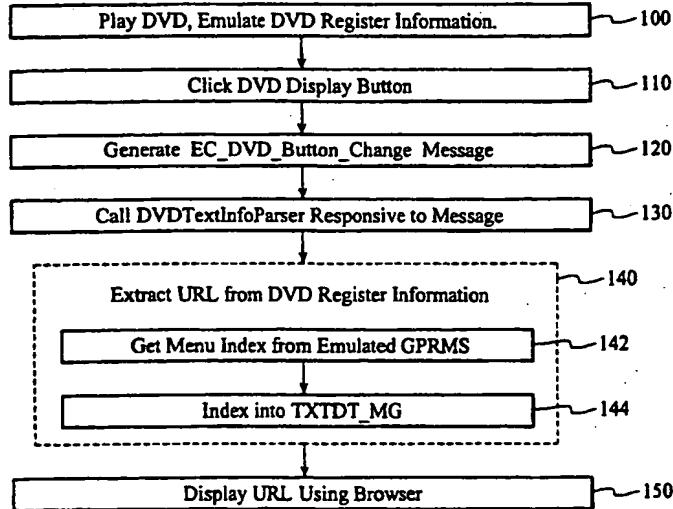
(57) Abstract

A system integrates a DVD system and a WWW web browser. Universal Resource Locator (URL) information corresponding to sites accessible by the browser are stored in fields within the DVD data. When the user actuates a DVD element that has a corresponding URL, the web browser displays information from that site. When the user actuates an HTML menu or other browser-implemented feature, the DVD system accesses a portion of the DVD data specified in the menu. This arrangement provides for two-way communication, i.e., HTML in the browser is able to control DVD content and vice-versa. Having the WWW information embedded in the DVD brings a number of benefits, the foremost of which is the ability to write a "one size fits all" template web page that can interrogate the DVD for URL information and present WWW content corresponding to the URL synchronized with the DVD information.

CONVERGENCE-ENABLED DVD AND WEB SYSTEM

Cross-Reference to Related Application

This application is based on and claims priority from U.S. Provisional Application Serial

5   Number 60/129,724, filed on April 16, 1999 and hereby incorporated by reference.

Background of the Invention

    1. Field of the Invention

The present invention is directed to interactive multimedia systems. More particularly, the

10   invention is directed to DVD systems which are able to selectively control the processing of content
from the World Wide Web and the like, and to web-based systems which are able to selectively access
DVD systems and the like.

    2. Background of the Related Art

15   Digital Versatile Discs (or variously Digital Video Discs or DVDs) and the World Wide Web
(WWW) are extremely powerful interactive multimedia tools. However, they both have their
drawbacks. Although DVDs are capable of storing large amounts of high-quality video and audio
data, once they are manufactured their content is essentially static; it cannot be changed, updated or
personalized. Also, the limited interactivity does not meet the demands of many of today's computer-

20   literate users. Further, although the WWW is dynamic and rapidly changing, it is not capable of
providing high-quality multimedia content in real time for many users due to limited bandwidth.

Summary of the Invention

The present invention has been made with the above problems of the prior art in mind, and a

25   first object of the present invention is to provide a system for integrating static and interactive
multimedia delivery systems such as DVD systems and the WWW.

It is another object of the present invention to provide a multimedia delivery system which is
interactive and easily modifiable.

It is a further object of the present invention to provide a highly interactive and dynamic

30   multimedia system which is capable of providing high-quality multimedia content.

The above objects are achieved according to an aspect of the present invention by providing a
system which integrates a DVD system and WWW content or similarly presented information, such
as HTML-formatted material. Universal Resource Locator (URL) information corresponding to sites
or media streams accessible via the WWW or another content delivery system are stored in fields

35   within the DVD data. When a user actuates a DVD element that has a corresponding URL the
information from that site is displayed in a web browser to enhance the DVD viewing experience.

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Conversely, the DVD system can be controlled when the user actuates HTML information from a web page or the like. This arrangement provides for two-way control, i.e., HTML is able to control DVD content and vice-versa. Having the WWW information embedded in the DVD brings a number of benefits, perhaps the foremost of which is the ability to write a "one size fits all" template web page

5   that can interrogate the DVD for URL information and present WWW content corresponding to the URL information and synchronized with the DVD content.

Brief Description of the Drawings

These and other objects, features, and advantages of the present invention are better understood

10   by reading the following detailed description of the preferred embodiment, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a block diagram of an integrated DVD and web browser system according to a preferred embodiment of the present invention;

FIGURE 2 is an example screen showing DVD and WWW playback according to the preferred

15   embodiment; and

FIGURE 3 is a flowchart showing the steps in displaying DVD content in conjunction with WWW or streamed media content in the preferred embodiment.

Detailed Description of the Presently Preferred Exemplary Embodiment

20   FIG. 1 shows an integrated DVD/WWW system (preferably known as a "Convergence Enabled System") according to a preferred embodiment of the present invention. As is well known in the art, web browser 10 is preferably implemented on a personal computer or the like. The browser can preferably simultaneously display web content and DVD content or can be readily adapted to do so as will be apparent to those skilled in the art. Also, the DVD system 20 is preferably a DVD drive and

25   associated support circuitry installed within the computer; however, a dedicated DVD player communicable with and controllable by the computer may also be used for this purpose. Further, DVD 70 played by the DVD system 20 is preferably specially authored as described in greater detail below.

In use, the browser 10 displays a web page 30 defined by, e.g., HTML code, and stored at a site

30   specified by the user to the browser 10. The browser 10 may also display a separate or integrated playback field 40, i.e., a window, frame or other field) for video content from DVD system 20 or streamed content from the WWW, with synchronized audio from the DVD 20 or streamed content played on the computer's speakers as is known in the art (see FIG. 2). Preferably, the playback field 40 is generated by a media player 80, such as the Microsoft Windows Media Player, with a call

35   thereto embedded in HTML code for the displayed web page as is known in the art. Other multimedia players may also be adapted for this purpose as well.

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As is known in the art, DVD systems may be configured to display buttons and the like to
enable a user to navigate the DVD 70 and access various portions thereof. In a dedicated DVD
player, these buttons are accessed by a cursor controlled by cursor direction keys on the DVD player's
console, remote control or the like; however, when a DVD is played in the computer using the media

5   player 80, the buttons may be accessed by positioning or clicking the computer's mouse cursor on the
buttons displayed by the media player 80 as is common with graphical user interfaces as shown in
Step 110 of FIG. 3. When this occurs, the media player 80 generates a Windows event message such
as EC_DVD_Button_Change signifying that a particular button has been selected or actuated and
providing its number (Step 120). In the preferred embodiment, this message is intercepted by an

10   event script 50 which calls DVDTextInfoParser 60 (Step 130), a custom object that uses the current
DVD button (provided by the media player 80 via EC_DVD_Button_Change) and information
extracted from a particular field within the DVD 70 corresponding to that button as described in
greater detail below in order to obtain a URL (Step 140) that can be accessed by the web browser 10
and displayed on the web page 30 (Step 150).

15   More specifically, as is known in the art the media player 80 preferably generates information
on the current status of the DVD 70 as part of its playback process. The DVD 70 is preferably
authored to cause the DVD system 20 to write the index of the currently displayed menu into a
specific General DVD parameter (GPRM) by, e.g., inserting DVD commands at strategic places into
the DVD data set during its compilation. An example of a DVD authoring system which

20   automatically performs this task is described in United States Patent Application No. 09/010,267 to
Brodersen et al., incorporated herein by reference. A commercially available system which
automatically performs this task is the DVD Maestro system of Spruce Technologies of San Jose, CA.

In Step 100, the media player 80 will then emulate this register information (the GPRMs) when
playing DVDs; for example, the method in which the windows media player does this is explained in

25   Microsoft's documentation for the program. The menu index thus obtained from the GPRMs in Step
142 can be used in Step 144 as an index into corresponding fields in the DVD's TXTDT_MG
structure, also read in by the media player 80, which contains URLs stored there by the DVD
authoring system. As detailed in the DVD specification, the TXTDT_MG structure within the DVD
data includes various predefined fields holding specified information such as producer name, vocalist

30   name, languages and the like, and a provider-unique field designated for such use may be used to
store the URL. Thus, by monitoring the designated GPRM, an outside program such as the event
script 50 can reliably derive the appropriate URL from the current menu index and the current button.

For systems using Microsoft DirectShow, the DVDTextInfoParser object (based on an ATL
COM interface named IDVDTextInfoParser) can preferably facilitate playback of DVD 70 using the

35   DirectShow DVDGraphBuilder interface; however, other techniques also will be readily apparent to
those skilled in the art. As described above, DVDTextInfoParser then accesses the DirectShow

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IDVDInfo interface to read in text data. This technique is used in the preferred embodiment; however, other techniques can be used with platforms on which DirectShow is not available; for example, the TXTDT_MG structure can be directly read in from the DVD 70.

Preferably, event script 50 is a Java script; however, alternative implementations such as a
5   Microsoft Visual Basic Script may be used instead. Also, DVDTextInfoParser 60 is preferably an ActiveX control using an ATL COM interface; however, other program implementations may be used as well. Further, although DVDTextInfoParser 60 may access the DVD system 20 each time a URL is needed, in the preferred embodiment it preferably reads the TXTDT_MG structure into memory each time a DVD 70 is initialized, and references the information in memory. This is because the
10 Windows Media Player used as the media player 80 in the preferred embodiment does not work well with other objects simultaneously accessing interfaces to the same DVD 70. If this problem is resolved in future versions of DirectShow, the access-as-needed scheme might work equally well.

Thus, a "one size fits all" template web page could be made in which a field 40 displays DVD playback while a window 30 displays web content. When the user selects a button, the media player
15 80 generates an EC_Button_Change event which is acted upon by the event script 50 to call DVDTextInfoParser 60 based on the button number and menu title index number to obtain the corresponding URL from the DVD's TXTDT_MG structure. The content corresponding to the retrieved URL is then displayed in the web page 30. Similarly, when an EC_Domain_Change or EC_Chapter_Change event occurs, DVDTextInfoParser 60 could be called to check for corresponding
20 URLs and synchronize the web content in web page 30 to the current chapter displayed in playback field 40. If the corresponding URL content contains a reference to streaming content, the streaming video can be displayed in combination with or in place of the DVD content.

In a similar manner, HTML code in the web page 30 may make calls to the event script 50 or a similar script to retrieve the URLs stored in TXTDT_MG as will be readily apparent to those skilled
25 in the art. These may then be displayed in the web page 30 as hyperlinks, controls or the like to enable the browser to display web content 30 corresponding to URLS in the DVD 70. Thus, rather than or in conjunction with controlling the system by accessing features of the DVD display 40 as described above, the system may be controlled by accessing features of the web page 30.

The above description of the preferred embodiment has been presented for explanation purposes
30 only, and the present invention is not so limited. Modifications, embellishments and alternative implementations of the invention will be readily apparent those skilled in the art and are encompassed by the invention.

For example, in the preferred embodiment the URLs associated with the DVD menu buttons have been references to web pages or streaming video; however, the URLs may point to other types of
35 resources and rely on the system to call appropriate helper applications; for example, a URL might point to a file in Adobe Acrobat PDF format, so that when the browser accesses it the Adobe Acrobat

reader will automatically be called to display it. Even further, the URLs need not point to data files, but can also refer to programs which will be played when the corresponding buttons are actuated or the like.

Further, numerous practical applications of the invention will become apparent to those skilled
5   in the art. For example, information on events and webcasts could be distributed in the form of an electronic magazine. Consumers would receive the electronic magazine in the mail on DVD. The DVD can combine rich video content of the various artists and events, high quality samples of content (webcasts, etc.) to be purchased, interviews, concert information and the ability to purchase associated merchandise all on one disc. Since the disc uses high quality graphical elements that are assembled
10   from an HTML template stored on a separate server, the viewer's experience can change as often as the DVD distributor wishes. In fact, different content may be served to different consumers based on parameters in the URLs. The fact that one disc can be a totally different experience for everyone that views it makes the system a highly flexible and effective advertising medium.

In another potential application, a DVD containing a business or sales training program
15   produced to take advantage of many DVD features, such as Multiple Language Tracks and Multiple Camera Angles, could be distributed worldwide. Viewers could interact directly with the content and be qualified based on their performance. The DVDs would be usable at any time as an offline reference.

In yet another potential application, a professor works with his AV team to author several
20   DVDs to be distributed to the students to take with them. The student may then view lectures and seminars from top professors from around the world in their own home. Classwork and tests could be administered remotely via each professor's website. Scheduled class hours with chat boards would give the student the ability to refer to every discussion that ever took place at any given time, and the DVDs could be saved as future references.

25   Such variations and implementations are to be considered within the scope of the present invention.

WHAT IS CLAIMED IS:

1. A system comprising:

a DVD unit for playing a DVD and generating information representative of the contents thereof;

URL deriving means for receiving the information and deriving a Universal Resource Locator (URL) from the information;

a browser for displaying content designated by the URL; and

a media player for playing video content within the information from the DVD.

2. The system of claim 1, wherein the URL deriving means comprises a DVD text information parser for receiving the information and parsing the information to derive data containing the URL therefrom.

3. The system of claim 2, wherein:

the DVD causes the media player to store indicia of a current position of play within the DVD; and

the DVD text information parser is for using the indicia to index into the control data to obtain the URL.

4. The system of claim 1, wherein the content specified by the URL is HTML-coded.

5. The system of claim 1, wherein the content specified by the URL is streaming media content.

6. The system of claim 1, wherein:

the media player is for displaying a menu button specified by the information from the DVD, the menu button being associated with the URL; and

the browser is for displaying the content specified by the URL responsive to user actuation of the menu button.

7. The system of claim 6, wherein:

the URL deriving means comprises a DVD text information parser for receiving the information and parsing the information to derive data containing the URL therefrom;

the media player is for generating a button number message responsive to the user actuation of the menu button; and

the URL deriving means further comprises an event script for receiving the message and responsive thereto calling the DVD text information parser.

8. The system of claim 6, wherein:

the URL deriving means comprises a DVD text information parser for receiving the information and parsing the information to derive data containing the URL therefrom;

the URL deriving means is further for reading control data from the DVD, the control data including the URL; and

the DVD text information parser is for using the button number message to index into the control data to obtain the URL.

9. A system comprising:

a DVD unit for playing a DVD and generating information representative of the contents thereof;

URL deriving means for receiving the information and deriving a Universal Resource Locator (URL) from the information;

a browser for displaying a hyperlink corresponding to the URL and, responsive to actuation thereof, content designated by the URL; and

a media player for playing video content within the information from the DVD.

10. The system of claim 9, wherein the URL deriving means comprises a DVD text information parser for receiving the information and parsing the information to derive data containing the URL therefrom.

11. The system of claim 9, wherein the content specified by the URL is HTML-coded.

12. The system of claim 9, wherein the content specified by the URL is streaming media content.

13. A system comprising:

a DVD unit for playing a DVD and generating information representative of the contents thereof;

URL deriving means for receiving the information and deriving a Universal Resource Locator (URL) from the information;

a browser for displaying a hyperlink corresponding to the URL and, responsive to actuation thereof, content designated by the URL; and

a media player for playing video content within the information from the DVD, the video content including a button associated with the URL;

wherein the browser is further for displaying content designated by the URL responsive to an actuation of the button.

14. The system of claim 13, wherein the information from the DVD includes positional information associated with the URL.

15. The system of claim 14, wherein the positional information indicates a position of the button within the DVD content.

16. A system comprising:

a DVD unit for playing a DVD and generating information representative of the contents thereof, the DVD information including a command to write a current position of the DVD into a general DVD parameter register of the DVD unit;

URL deriving means for receiving the information and deriving a plurality of Universal Resource Locators (URLs) from the information;

a browser for displaying content designated by the URLs; and

a media player for playing video content within the information from the DVD, the video content including a plurality of buttons associated with the URLs, the association between the buttons and URLs being responsive to positional information in the general DVD parameter register.

17. A system comprising:

a DVD unit for playing a DVD and generating information representative of the contents thereof;

a DVD text information parser for receiving the information and, based on positional playback data in the information, parsing the information to derive the URL therefrom.

a browser for displaying a hyperlink corresponding to the URL and, responsive to actuation thereof, content designated by the URL; and

a media player for playing video content within the information from the DVD.

18. The system of claim 17, wherein the information includes commands causing the media player to write the positional playback data in the media player's general DVD parameter registers.

19. The system of claim 17, wherein:

the information includes a data structure specifying a plurality of URLs; and

the DVD text information parser uses the positional playback data to index into the data structure to obtain the URL.
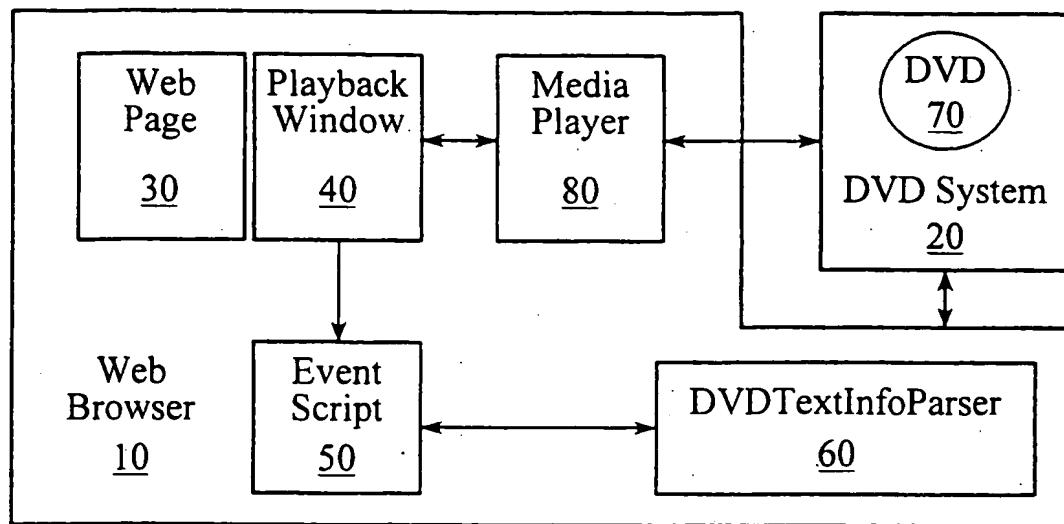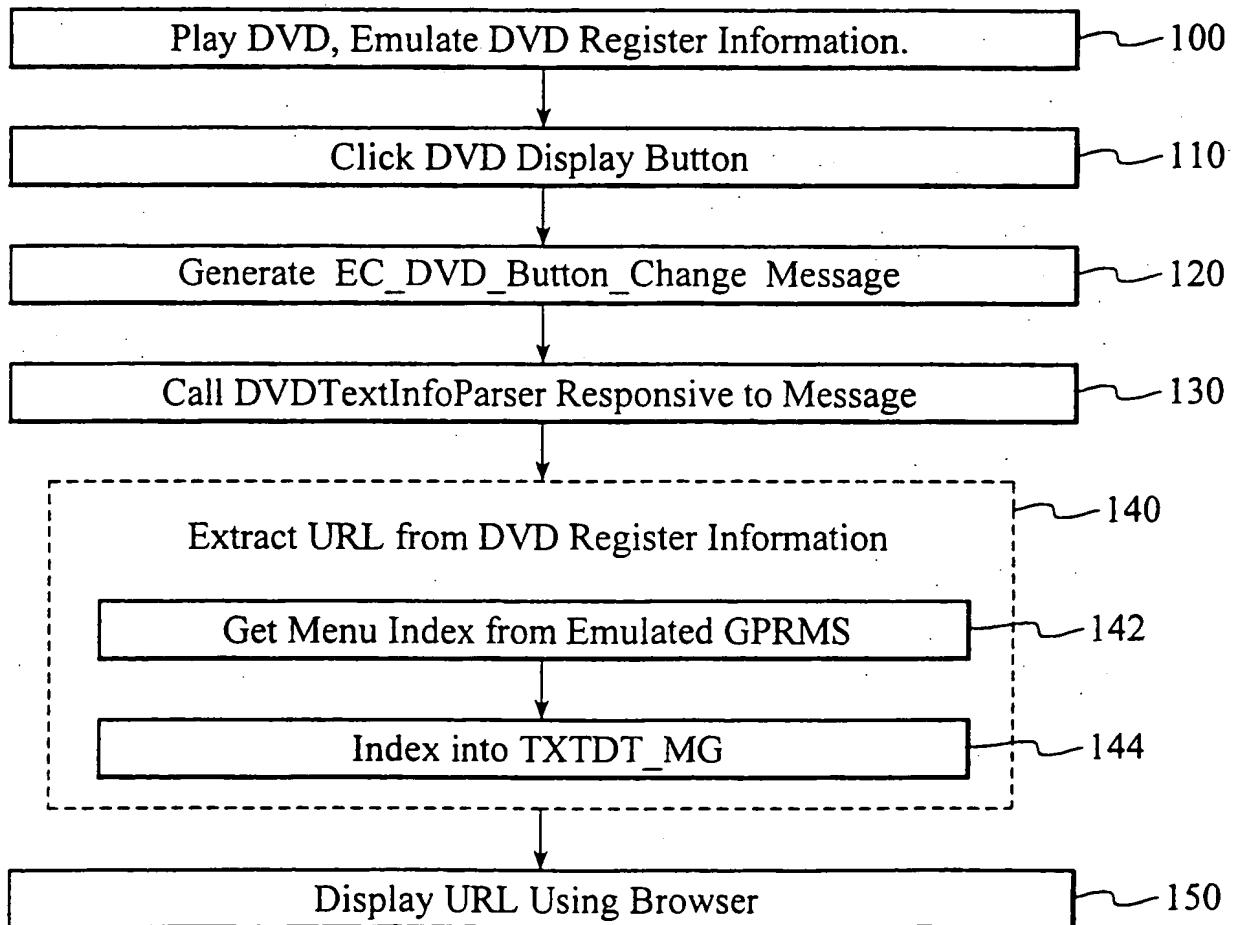
1/2
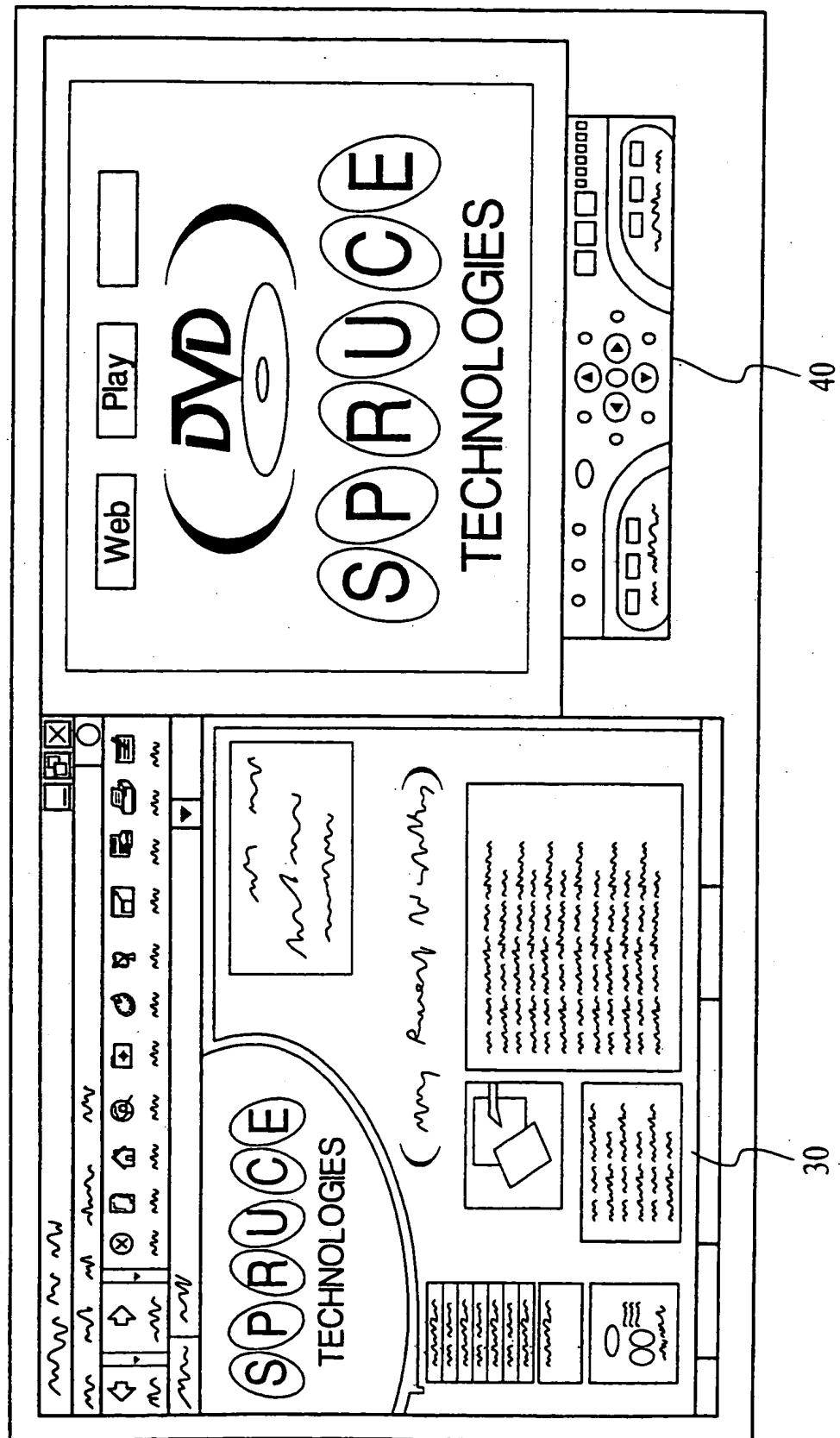
Web Browser 10					
	Web Page 30	Playback Window 40	Media Player 80		DVD 70 DVD System 20
	Web Browser 10	Event Script 50	DVDTextInfoParser 60		

FIG. 1

Play DVD, Emulate DVD Register Information.	⌐ 100
Click DVD Display Button	⌐ 110
Generate EC_DVD_Button_Change Message	⌐ 120
Call DVDTextInfoParser Responsive to Message	⌐ 130

Extract URL from DVD Register Information — 140

Get Menu Index from Emulated GPRMS	⌐ 142
Index into TXTDT_MG	⌐ 144

Display URL Using Browser	⌐ 150

FIG. 3

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FIG. 2

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7   G11B27/10   G11B19/02   G06F17/30   G09B5/06   G06F17/60
//H04N5/85

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7   G11B   G06F   H04N   G09B   H04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal, IBM-TDB, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 08, 30 June 1998 (1998-06-30) & JP 10 063562 A (HITACHI LTD), 6 March 1998 (1998-03-06) abstract	1,4,6,9, 11,13-15
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[X] Further documents are listed in the continuation of box C.   [X] Patent family members are listed in annex.

Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2000	27/07/2000

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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P,X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 11, 30 September 1999 (1999-09-30) & JP 11 161663 A (TOSHIBA CORP), 18 June 1999 (1999-06-18) abstract & JP 11 161663 A: figures 1-9	1,4,6,9, 11,13-15
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A	MASCHA M ET AL: "Interactive education: Transitioning CD-ROMs to the Web" COMPUTER NETWORKS AND ISDN SYSTEMS,NL,NORTH HOLLAND PUBLISHING. AMSTERDAM, vol. 27, no. 2, 1 November 1994 (1994-11-01), pages 267-272, XP004037997 ISSN: 0169-7552 the whole document	

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